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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/788,629	02/16/2001	Tatehito Usui	503.39581X00	5499

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EXAMINER

GOUDREAU, GEORGE A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 08/28/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09-788,629

Applicant(s)

Usui et al

Examiner

George Gouldreau

Group Art Unit

1763

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☒ Responsive to communication(s) filed on (2-01 to 8-01) (i.e., papers # 1-3)
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-33 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☒ Claim(s) 5, 8, 23-25, 29 is/are allowed.
- ☒ Claim(s) 1-4, 6-7, 9-10, 12-16, 21, 26-28, 31-33 is/are rejected.
- ☒ Claim(s) 11, 17-20, 22, 30 is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☒ All ☐ Some* ☐ None of the:
- ☒ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. _____
- ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☐ Interview Summary, PTO-413
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other _____

Office Action Summary

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1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Tendys et. al. (2-1987).

Tendys et. al. disclose a process, and apparatus for monitoring the ion current in the plasma using an electrostatic double probe. The electrostatic double probe employs a LED diode inside the plasma processing chamber to indirectly measure the ion current in the plasma. Ions in the plasma are injected into the LED device when the electrostatic double probe is exposed to the plasma. The LED device then emits light which is captured by an optical fiber which transmit the light to a photo detector. The ion current in the plasma can then be calculated based upon the intensity of the light emitted from the LED. This is done by comparing the light intensity signal to a reference plot which correlates the LED light intensity signal to the plasma ion current under known process conditions. This is discussed specifically on pages 315-317. This is shown in figures 1-5.

3. Claims 1-4, 6-7, 9-10, 12, 15, 21, 28, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Ejima et. al. (1-1974).

Ejima et. al. disclose a process, and apparatus for monitoring the plasma potential using a plasmascop. The plasmascop is comprised of a matrix of 49 wires which are individually connected to a series of FET circuits. The series of FET circuits are individually connected to a series of LEDs. The LEDs emit at an intensity which is proportional to the plasma potential in the region where each wire locally samples the

plasma. The wires in the plasma scope are arranged in a 7×7 matrix of a Langmuir probe such that they provide information regarding the uniformity of the plasma potential across the surface of the plasma processing apparatus. The unit is fabricated on a printed circuit board (i.e.-the substrate to be processed). Several probes may be used to monitor different positions in the plasma processing apparatus in order to generate a more complete picture of the uniformity of the plasma potential in the plasma processing apparatus. The information regarding the uniformity of the plasma potential is provided by a visual inspection of the light intensity emitted at each of the LEDs. The LED brightness may then be compared to a graph of the LED forward current versus relative brightness in order to determine the plasma current at each of the sampling locations. The LED potential (i.e.-FET gate voltage) may then be ascertained from the calculated LED forward currents when the LED current is compared to a graph of the LED forward current versus the FET gate voltage. A computer may be used to automate the process as well as to perform all of the calculations. This is discussed on pages 57-58. This is shown in figures 1-3.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 13, 16, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ejima et. al. as applied in paragraph 3 above.

Ejima et. al. fail to disclose the following aspects of applicant's claimed invention:

- the specific usage of the type of LED unit which is claimed by the applicant; and
- the specific usage of optical fibers to transmit light generated by the various LED units to the associated photocells used to measure the intensities of the light emitted by the LED units

It would have been obvious to one skilled in the art to fabricate the LED unit in the apparatus/ process taught above out of a semiconductor wafer with a gate oxide layer based upon the following. The formation of an LED unit out of a semiconductor wafer with a gate oxide layer is conventional or at least well known in the semiconductor processing arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for forming an LED structure to the specific means which are taught by the applicant.

It would have been obvious to one skilled in the art to employ photocells, and optical fibers to quantify the amount of light generated by each of the LED units in the process/ apparatus taught above based upon the following. The usage of photocells to

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measure, and quantify the amount of light generated by an LED unit is conventional or at least well known in the test/ measurement arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for quantifying the amount of uniformity or variation in the plasma ion current across the surface of the substrate to be profiled in the process taught above to the specific means which are taught above. Also, it would have been obvious to one skilled in the art to employ optical fibers to transmit the light signals generated by each of the LED units to an associated photocell in the process taught above based upon the following. The usage of optical fibers to transmit light between two components is conventional or at least well known in the test/ measurement arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for transmitting light signals between two components in a test/ measurement apparatus to the specific means which are taught above.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tendys as applied in paragraph 2 above.

Tendys fails to disclose the following aspects of applicant's claimed invention:

-the specific usage of the type of LED unit which is claimed by the applicant

It would have been obvious to one skilled in the art to fabricate the LED unit in the apparatus/ process taught above out of a semiconductor wafer with a gate oxide layer based upon the following. The formation of an LED unit out of a semiconductor wafer with a gate oxide layer is conventional or at least well known in the semiconductor processing arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for forming an LED structure to the specific means which are taught by the applicant.

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8. Claims 14, 26-27, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-In line 4 of claim 14, the phrase "said AC voltage" lacks proper antecedent basis.;

-In line 4 of claim 26, the phrase "said potential difference" lacks proper antecedent basis.;

-In line 5 of claim 27, the phrase "said potential difference and current measuring portion" lacks proper antecedent basis.;

-In lines 3-4 of claim 33, the phrase "said AC voltage" lacks proper antecedent basis.

9. Claims 11, 17-20, 22 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 5, 8, 23-25, and 29 are allowed.

11. Claims 14, and 33 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

12. Claims 26-27 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A. Goudreau whose telephone number is (703) -308-1915. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) -306-3186.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.



George A. Goudreau/gag

Primary Examiner

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